AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An *n*-type diamondoid material comprising [[an]] a diamondoid ~~electron-donating heteroatom~~ and a metal atom to enhance electrical conductivity, wherein the diamondoid comprises an electron-donating heteroatom.

2. (Original) The *n*-type diamondoid material of claim 1, wherein the electron-donating heteroatom is a group V element.

3. (Original) The *n*-type diamondoid material of claim 1, wherein the electron-donating heteroatom is selected from the group consisting of nitrogen, phosphorus, and arsenic.

4. (Original) The *n*-type diamondoid material of claim 1, wherein the material comprises an aza-diamondoid.

5. (Original) The *n*-type diamondoid material of claim 1, wherein the electron-donating heteroatom occupies a substitutional site on the diamond lattice.

6. (Original) The *n*-type diamondoid material of claim 1, wherein the electron-donating heteroatom is sp^3-hybridized in the diamond lattice.

7. (Original) The *n*-type diamondoid material of claim 1, wherein the diamondoid is selected from the group consisting of adamantane, diamantane, and triamantane.

8. (Currently Amended) ~~The~~ An *n*-type diamondoid material comprising a diamondoid ~~of claim 1~~, wherein the diamondoid comprises an electron-donating heteroatom

and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

9. (Currently Amended) The *n*-type diamondoid material of claim 1, wherein the material is a ~~polymerized heterodiamondoid~~ molecular crystal.

10. (Canceled)

11. (Currently Amended) The ~~polymerized heterodiamondoid~~ *n*-type diamondoid material of claim [[10]] 1, wherein the metal is gold.

12. (Currently Amended) A *p*-type diamondoid material comprising [[an]] a diamondoid ~~electron-withdrawing heteroatom~~ and a metal atom to enhance electrical conductivity, wherein the diamondoid comprises an electron-withdrawing heteroatom.

13. (Original) The *p*-type diamondoid material of claim 12, wherein the electron-withdrawing heteroatom is a group III element.

14. (Original) The *p*-type diamondoid material of claim 12, wherein the electron-withdrawing heteroatom is selected from the group consisting of boron and aluminum.

15. (Previously Presented) The *p*-type diamondoid material of claim 12, wherein the material comprises a boro-diamondoid.

16. (Original) The *p*-type diamondoid material of claim 12, wherein the electron withdrawing heteroatom occupies a substitutional site on the diamond lattice.

17. (Original) The *p*-type diamondoid material of claim 12, wherein the electron withdrawing heteroatom is sp^3-hybridized in the diamond lattice.

18. (Original) The *p*-type diamondoid material of claim 12, wherein the diamondoid is selected from the group consisting of adamantane, diamantane, and triamantane.

19. (Currently Amended) ~~The~~ A *p*-type diamondoid material comprising a diamondoid ~~of claim 12~~, wherein the diamondoid comprises an electron-withdrawing heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

20. (Currently Amended) The *p*-type diamondoid material of claim 12, wherein the material is a ~~polymerized heterodiamondoid~~ molecular crystal.

21. (Canceled)

22. (Currently Amended) The ~~polymerized heterodiamondoid~~ *p*-type diamondoid material of claim [[21]] 12, wherein the metal is gold.

23. (Currently Amended) An electrical *p-n* junction comprising a *p*-type diamondoid material and an *n*-type diamondoid material, wherein the *n*-type diamondoid material comprises a first diamondoid comprising an electron-donating heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane and wherein the *p*-type diamondoid material comprises a second diamondoid comprising an electron-withdrawing heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

24. (Original) The *p-n* junction of claim 23, wherein the *n*-type diamondoid material is aza-heterodiamondoid.

25. (Original) The *p-n* junction of claim 23, wherein the *n*-type diamondoid material is phospho-heterodiamondoid.

26. (Original) The *p-n* junction of claim 23, wherein the *p*-type diamondoid material is boro-heterodiamondoid.

27. (Currently Amended) A diamondoid transistor comprising an *n*-type ~~heterodiamondoid~~ diamondoid material and a *p*-type diamondoid material, wherein the *n*-type diamondoid material comprises a first diamondoid comprising an electron-donating heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane and wherein the *p*-type diamondoid material comprises a second diamondoid comprising an electron-withdrawing heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

28. (Original) The diamondoid transistor of claim 27, wherein the transistor comprises an *n-p-n* field effect transistor.

29. (Previously Presented) The diamondoid transistor of claim 27, wherein the transistor comprises a *p-n-p* field effect transistor.

30. (Original) The diamondoid transistor of claim 27, wherein the *n*-type diamondoid material is aza-heterodiamondoid.

31. (Original) The diamondoid transistor of claim 27, wherein the *n*-type diamondoid material is phospho-heterodiamondoid.

32. (Original) The diamondoid transistor of claim 27, wherein the *p*-type diamondoid material is boro-heterodiamondoid.

33. (Currently Amended) The diamondoid transistor of claim 27 further comprising a source, gate, and drain, wherein the source and drain are fabricated from the *n*-

type ~~heterodiamondoid~~ diamondoid material, and the gate is fabricated from the *p*-type diamondoid material.

34. (Currently Amended) The diamondoid transistor of claim 27 further comprising a source, gate, and drain, wherein the source and drain are fabricated from the *p*-type ~~heterodiamondoid~~ diamondoid material, and the gate is fabricated from the *n*-type diamondoid material.

35. (Canceled)

36. (Canceled)

37. (Canceled)

38. (Canceled)

39. (Currently Amended) A diamondoid transistor comprising electrically conducting regions and electrically insulating regions, wherein:

the electrically conducting regions of the transistor comprise *n* and *p*-type ~~heterodiamondoid~~ diamondoid materials, wherein the *n*-type diamondoid material comprises a first diamondoid comprising an electron-donating heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane and wherein the p-type diamondoid material comprises a second diamondoid comprising an electron-withdrawing heteroatom and is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane; and

the electrically insulating regions of the transistor comprise undoped diamondoid materials.

40. (Original) The transistor of claim 39, wherein the *n*-type diamondoid material comprises aza-heterodiamondoid.

41. (Original) The transistor of claim 39, wherein the *n*-type diamondoid material comprises phospho-heterodiamondoid.

42. (Original) The transistor of claim 39, wherein the *p*-type diamondoid material comprises boro-heterodiamondoid.

43. (New) A diamondoid material comprising polymerized diamondoids, wherein each diamondoid comprises at least one electron-donating heteroatom or at least one electron-withdrawing heteroatom and further wherein the diamondoids are selected from the group consisting of diamantane, triamantane, tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

44. (New) A diamondoid material comprising a molecular crystal of diamondoids held together by van der Waals forces, wherein each diamondoid comprises at least one electron-donating heteroatom or at least one electron-withdrawing heteroatom and further wherein the diamondoids are selected from the group consisting of adamantane, diamantane, triamantane, tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.